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joint work with

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Guaranteed, locally space-time efficient, and polynomial-degree robust a posteriori error estimates for high-order discretizations of parabolic problems

We present a posteriori error estimates in parabolic energy norms for space-time discretisations based on arbitrary-order conforming FEM in space and discontinuous Galerkin methods in time. Using the heat equation as a model problem, we show a posteriori error estimates in a norm of $L^2(H^1) \cap H^1(H^{-1})$-type that is suitably extended to functions of the nonconforming discrete space. The estimators give guaranteed upper bounds on the error, and locally space-time efficient lower bounds. Furthermore, the efficiency constants are robust with respect to the discretisation parameters, including the polynomial degrees in both space and time, and also with respect to refinement and coarsening between time-steps, thereby removing the need for the transition conditions required in earlier works.